

# Measure Tree Height on a Slope: Two-Triangle with Feet Lower than Tree Base

## Field Guide

### Task

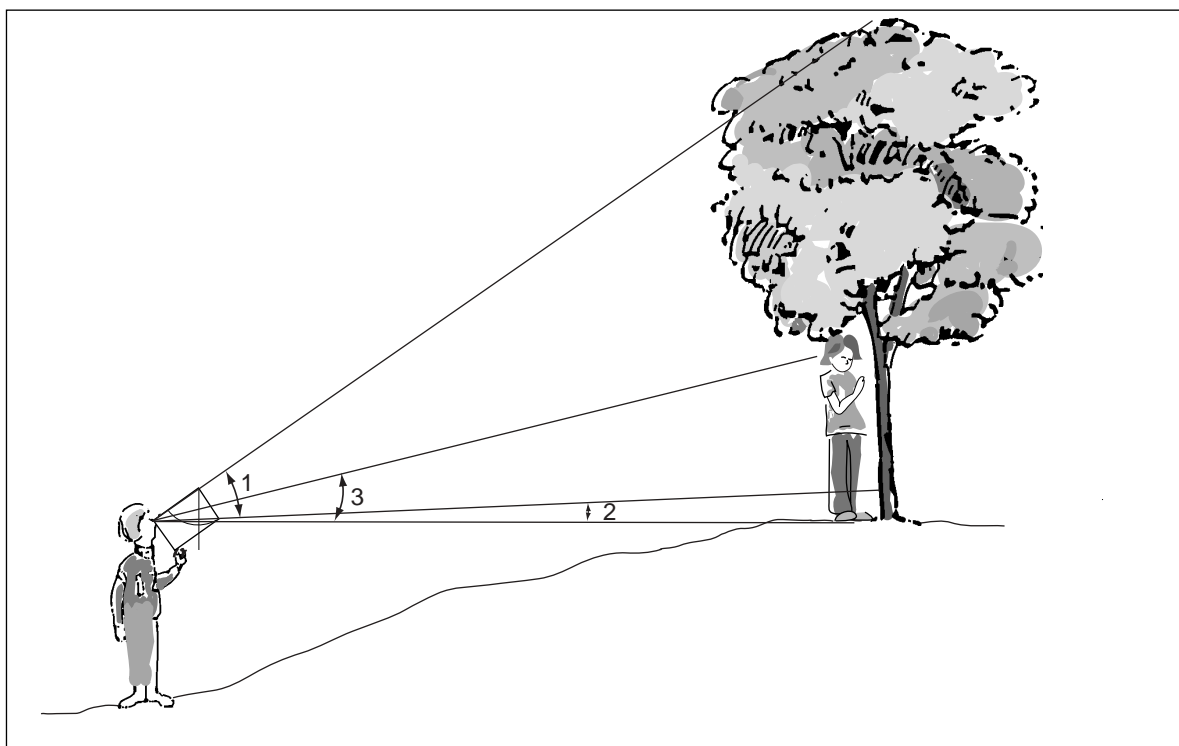
Measure heights of shrubs and/or trees to help determine the MUC class of your Land Cover Sample Sites.

### What You Need

- ☐ 50 m measuring tape
- ☐ Flexible measuring tape
- ☐ Small bean bag
- ☐ *Measure Tree Height on a Slope:  
Two-Triangle with Feet Lower than  
Tree Base Data Sheet*
- ☐ *Table of Cosines*
- ☐ Pen or pencil
- ☐ Permanent tree markers (optional)
- ☐ Clinometer
- ☐ Species ID keys and/or other local  
species guides
- ☐ Blindfold

### In the Field

1. Work in a team of three. Two of you should be about the same height. You and another partner move away from the base of the tree until you can see the top of the tree through the drinking straw of the clinometer. **Note:** For the best results, adjust your distance so that the clinometer is as close to 30 degrees as possible and you are further from the tree than it is tall.
2. Site the top of the tree using the clinometer. Have your partner read and record the clinometer angle. This is  $\angle 1$ .
3. Using the *Table of Tangents*, record the TAN of the angle on the *Measure Tree Height on a Slope: Two-Triangle with Feet Lower than Tree Base Data Sheet*.
4. Site the base of the tree using the clinometer. Have your partner read and record this clinometer angle. This is  $\angle 2$ .
5. Using the *Table of Tangents*, record the TAN of the angle on the *Measure Tree Height on a Slope: Two-Triangle with Feet Lower than Tree Base Data Sheet*.
6. Have your partner who is about your height stand by the tree. Site your partner's eyes through the straw of the clinometer. Your other partner reads and records this clinometer angle. This is  $\angle 3$ .
7. Using the *Table of Cosines*, record the COS of the angle on the *Measure Tree Height on a Slope: Two-Triangle with Feet Lower than Tree Base Data Sheet*.



8. Measure the horizontal distance from you to the base of the tree. Have your partner help you using the 50 m tape. Record this in the *Measure Tree Height on a Slope: Two-Triangle with Feet Lower than Tree Base Data Sheet*.
9. Calculate the Baseline using the following formula:  
 $(\text{Distance to the Tree}) \times \cos(\text{Angle to Partner's Eyes})$
10. Calculate the tree height using the following formula:  
 $\tan(1^{\text{st}} \text{ Angle of the Clinometer}) \times (\text{Baseline}) - \tan(2^{\text{nd}} \text{ Angle of the Clinometer}) \times (\text{Baseline})$
11. Record the tree height in the *Measure Tree Height on a Slope: Two-Triangle with Feet Lower than Tree Base Data Sheet*.
12. Repeat steps 1-11 two more times for each tree and report the average value.